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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
TRIEU, THAI BA	
ART UNIT	**PAPER NUMBER**
3748	

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/808,609	MELCHIOR, JEAN FREDERIC	
	Examiner	Art Unit	
	Thai-Ba Trieu	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *5-9,11-50 and 52-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *5-9,11-50 and 52-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 09, 2006 has been entered.

Applicant's cooperation in amending the claims to overcome the claim objections relating to informalities as well as indefinite claim language is also appreciated.

Claims 5-9, 11-13, 15-20, and 22-45 were amended; claims 1-4, 10, and 51 were cancelled; and claims 52-55 were added.

Upon reconsideration, the indicated allowable subject matter of claims 5-50 has been withdrawn. A new Non-Final rejection set forth below.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

1. Claims 5 and its dependent claims 8-9 and 31-32; claims 6 and its dependent claim 29; claim 7 and its dependent claim 11 and 30; claims 12 and its dependent claims 13-16, 20-28, and 36-38; claim 17 and its dependent claim 33; claim 18 and its dependent claim 19 and 34-35; claim 39 and its dependent claim 41; claim 40 and its dependent claim 42; and claim 43, and its dependent claim 44-50 are rejected under 35

U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- In claims 1, 6, 7, 12, 17, 18, 39, 40, and 43, the recitation of :

"the constant volume of cooled air Vc being **less than** a volume drawn in by the engine at the maximum speed Nmax,

such that **at** a turbocharging adaptation speed Na, the volume drawn in by the engine is **equal to** the constant volume Vc;

such that **below** the turbocharging adaptation speed Na, the volume drawn in by the engine is **less than** the constant volume Vc, and a flow of the **cooled air** is deflected toward the turbocharging unit through the EGR bypass;

such that **above** the turbocharging adaptation speed Na, the volume drawn in by the engine is **more than** the constant volume Vc, and a flow of the ***exhaust gas*** is drawn in by the engine through the EGR bypass;"

renders the claims indefinite, since it is not clear that how can too many desired results happen at the same time/situation under the condition of the constant volume of cooled air Vc being **less than** a volume drawn in by the engine at the maximum speed Nmax? Applicant is required to revise and clarify the three desired results can be obtained under only one condition. Additionally, is there any conflict between two phrases, or contradict to each other:

1. the constant volume of cooled air Vc being **less than** a volume drawn in by the engine at the maximum speed Nmax.

2. (such that) **above** the turbocharging adaptation speed Na, the volume drawn in by the engine being **more than** the constant volume Vc.

Applicant is required to clarify this conflict or contradict of the two phrases.

2. Claim 55 recites the limitation "the hot exhaust gas" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 55 is rejected under 35 U.S.C. 102(b) as being anticipated by Flynn et al. (Patent Number 6,276,334 B1).

Flynn discloses a method of operating a reciprocating engine comprising:

retaining a hot exhaust gas fraction in a cylinder at a closure of the cylinder;

compressing air into intake conduits to create a stratification of temperatures and concentrations in a chamber at the combustion top dead center; and

vaporizing fuel in compressed air (See Column 17, lines 5-22, Column 22, lines 7-13 and 37-67, Column 3, lines 1-67, Column 4, lines 1-11, Column 25, lines 33-67, Column 26, lines 1-10, Column 37, lines 24-67).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (Patent Number EP 1 138 928 A2), in view Gianolio et al. (Pub. Number US 2003/0005898 A1), and further in view of Nelson (Patent Number 1,370,346).

Kim discloses a reciprocating engine used between a minimum speed of rotation Nmin and a maximum speed Nmax, comprising a turbocharging unit (18,20) which:

supplies the intake manifold (22) of the engine with air via a cooler (24) (See Figures 1 and 3-4, and Paragraph [0013]);

is supplied with gas by the exhaust manifold (26) of the engine at the exhaust temperature (See Figures 1 and 3-4, and Paragraph [0013]);

has a turbine inlet pressure substantially equal to the compressor discharge pressure (See Paragraph [0014])

wherein at constant air temperature and with a fixed geometry, the turbocharging delivers a substantially constant volume of cooled air Vc when the compressor discharge pressure varies,

wherein the volume Vc is substantially proportional to a turbine inlet section offered to hot exhaust gases,

wherein the turbine inlet pressure is maintained substantially equal to the compressor discharge pressure by an EGR bypass (28) provided between the intake manifold (22) and the exhaust manifold (26) dimensioned to transfer a flow of exhaust gas to the intake manifold without significant loss of pressure, and

wherein the volume of air Vc is less than the volume drawn in by the engine at the speed Nmax;

such that at a turbocharging adaptation speed Na, the volume drawn in by the engine is equal to the constant volume Vc;

such that below the turbocharging adaptation speed Na, the volume drawn in by the engine is less than the constant volume Vc, and a flow of the cooled air is deflected toward the turbocharging unit through the EGR bypass;

such that above the turbocharging adaptation speed Na, the volume drawn in by the engine is more than the constant volume Vc, and a flow of the exhaust gas is drawn

in by the engine through the EGR bypass (28) (See Paragraph [0014], lines 43-50; Paragraph [0018], and Paragraph [0019]).

However, Kim fails to disclose the structural details of the valves.

Gianolio teaches that it is conventional in the art of valve control for internal combustion engines, to utilize a reciprocating engine including a flat cylinder head valves having faces on a chamber side which are coplanar with the cylinder head and substantially tangent to a cylinder (See Figures 1 and 8 A-G),

wherein an intake pipe or pipes terminate(s) at an oblong nozzle defined by an upper half-cylinder resting on an upper edge of a conical seat and tangent to said seat along a generating line thereof situated in a plane substantially perpendicular to a plane passing through an axis of the seat and through an axis of the cylinder and through a lower cylinder covering half of a valve head opposite the generating line, wherein the nozzles are also oriented to create a tangential speed in a same direction (See Figure 1), and

wherein angles of the seats (1) are chosen to optimize stratification of a combustive charge (See Paragraph [0019]).

Additionally, Nelson teaches that it is conventional in the art of valve control for internal combustion engines, to utilize flat cylinder head bearing valves (B and 10).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the structural details of the valves, as taught by

Gianolio, and the flat cylinder head bearing valves, as taught by Nelson, to improve the performance efficiency of the Kim turbocharged internal combustion engine.

Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (Patent Number EP 1 138 928 A2), in view of Gianolio et al. (Pub. Number US 2003/0005898 A1) and Nelson (Patent Number 1,370,346), and further in view of Hammer (Patent Number 6,766,778 B2).

Kim discloses the invention as recited in the rejection of claim 39; however, Kim fails to disclose the structural details of the valves, the valve being the bearing valves, and a conical-sealing bearing surface.

Gianolio teaches that it is conventional in the art of valve control for internal combustion engines, to utilize a flat cylinder head valves having faces on a chamber side, which are coplanar with the cylinder head and substantially tangent to a cylinder,

> wherein a conical surface of intake valves is extended towards a piston by a cylindrical part having a height slightly greater than a lift of the valves,
>
> wherein the conical surfaces of the valves are disposed at a bottom of cylindrical recesses (Not Numbered) provided in a cylinder head in order to receive cylindrical parts of the valves such that flat lower faces of the valves are in a plane of the cylinder head when the lower faces rest on the associated seats thereof, a clearance between the recesses and the valves being minimal (See Figure 1), and

wherein the recesses are provided in the cylinder head and do not go beyond the following boundaries (See Figure 1):

- two cylindrical portions concentric with a bore and tangent externally and internally to the cylindrical recess (Not Numbered) of each valve, and

- a conical surface extending a half-seat of the valve delimited by a plane passing through an axis thereof and an axis of the cylinder;

wherein the recesses (Not Numbered) are also oriented to create a tangential velocity in a same direction, and

wherein an angle of the seats is chosen to optimize a stratification of a combustive charge (See Figures 1 and 8 A-G, and Paragraph 9).

Additionally, Nelson teaches that it is conventional in the art of valve control for internal combustion engines, to utilize flat cylinder head bearing valves (B and 10).

And then, Hammer teaches that it is conventional in the art of valve control for internal combustion engines, to utilize a conical sealing bearing surface (See Column 2, lines 58-65 and claim 4).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the structural details of the valves, as taught by Gianolio; the flat cylinder head bearing valves, as taught by Nelson; and a conical sealing bearing surface, as taught by Hammer, to improve the performance efficiency of the Kim turbocharged internal combustion engine.

Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (Patent Number EP 1 138 928 A2), in view Gianolio et al. (Pub. Number US 2003/0005898 A1), and Nelson (Patent Number 1,370,346), and further in view of Daub (Patent Number 3,056,392).

The modified Kim discloses the invention as recited above; however, fails to disclose two diametrically opposed intake valves.

Daub teaches that it is conventional in the internal combustion engine art, to utilize two diametrically opposed intake valves (16, 17) (See Figure 8, claims 19 and 21).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized two diametrically opposed intake valves, as taught by Daub, to improve the efficiency of the modified Kim device.

Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (Patent Number EP 1 138 928 A2), in view of Gianolio et al. (Pub. Number US 2003/0005898 A1), Nelson (Patent Number 1,370,346), and Hammer (Patent Number 6,766,778 B2). and further in view of Daub (Patent Number 3,056,392).

The modified Kim discloses the invention as recited above; however, fails to disclose two diametrically opposed intake valves.

Daub teaches that it is conventional in the internal combustion engine art, to utilize two diametrically opposed intake valves (16, 17) (See Figure 8, claims 19 and 21).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized two diametrically opposed intake valves, as taught by Daub, to improve the efficiency of the modified Kim device.

Claims 43 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (Patent Number EP 1 138 928 A2), in view of Flynn et al. (Patent Number 6,276,334 B1).

Kim discloses a reciprocating engine used between a minimum speed of rotation Nmin and a maximum speed Nmax, comprising a turbocharging unit (18,20) which:

supplies the intake manifold (22) of the engine with air via a cooler (24) (See Figures 1 and 3-4, and Paragraph [0013]);

is supplied with gas by the exhaust manifold (26) of the engine at the exhaust temperature (See Figures 1 and 3-4, and Paragraph [0013]);

has a turbine inlet pressure substantially equal to the compressor discharge pressure (See Paragraph [0014])

wherein at constant air temperature and with a fixed geometry, the turbocharging delivers a substantially constant volume of cooled air Vc when the compressor discharge pressure varies,

wherein the volume Vc is substantially proportional to a turbine inlet section offered to hot exhaust gases,

wherein the turbine inlet pressure is maintained substantially equal to the compressor discharge pressure by an EGR bypass

(28) provided between the intake manifold (22) and the exhaust manifold (26) dimensioned to transfer a flow of exhaust gas to the intake manifold without significant loss of pressure, and

wherein the volume of air Vc is less than the volume drawn in by the engine at the speed Nmax;

such that at a turbocharging adaptation speed Na, the volume drawn in by the engine is equal to the constant volume Vc;

such that below the turbocharging adaptation speed Na, the volume drawn in by the engine is less than the constant volume Vc, and a flow of the cooled air is deflected toward the turbocharging unit through the EGR bypass;

such that above the turbocharging adaptation speed Na, the volume drawn in by the engine is more than the constant volume Vc, and a flow of the exhaust gas is drawn in by the engine through the EGR bypass (28) (See Paragraph [0014], lines 43-50; Paragraph [0018], and Paragraph [0019]);

wherein a first ignition is controlled or triggered spontaneously by an injection of fuel at high pressure at the top dead center (See Figure 57, Column 33, lines 66-67, and Column 34, lines 1-15).

However, Kim fails to disclose a fraction of the exhaust gas, the compressed air creating a stratification of temperatures and concentrations in a combustion chamber and fuel vaporization.

Flynn teaches that it is conventional in the internal combustion engine art, to utilize a fraction of the transferred hot exhaust gas being retained in a cylinder at a closure of the cylinder; the compressed air being introduced by directive intake conduits to create a stratification of temperatures and concentrations in a chamber at the combustion top dead center; and a fuel vaporizing fuel in compressed air (See Column 17, lines 5-22, Column 22, lines 7-13 and 37-67, Column 3, lines 1-67, Column 4, lines 1-11, Column 25, lines 33-67, Column 26, lines 1-10, Column 37, lines 24-67).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized a fraction of the exhaust gas, the compressed air creating a stratification of temperatures and concentrations in a combustion chamber and fuel vaporization, as taught by Flynn, to improve performance efficiency of the Kim device.

Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (Patent Number EP 1 138 928 A2), in view of Flynn et al. (Patent Number 6,276,334 B1), and further in view of Hitomi et al. (Patent Number 5,509,394).

The modified Kim discloses the invention as recited above; however, fails to discloses ignition point being controlled by a timing of valves at the closure of the cylinder.

Hitomi teaches that it is conventional in the supercharged internal combustion engine art, to utilize ignition point being controlled by a timing of valves at the closure of the cylinder (See Column 5, lines 11-48).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized ignition point being controlled by a timing of valves at the closure of the cylinder, as taught by Hitomi, to improve the efficiency of the modified Kim device.

Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gianolio et al. (Pub. Number US 2003/0005898 A1), in view of Nelson (Patent Number 1,370,346).

Gianolio discloses a reciprocating engine including a flat cylinder head valves having faces on a chamber side which are coplanar with the cylinder head and substantially tangent to a cylinder (See Figures 1 and 8 A-G),

wherein an intake pipe or pipes terminate(s) at an oblong nozzle defined by an upper half-cylinder resting on an upper edge of a conical seat and tangent to said seat along a generating line thereof situated in a plane substantially perpendicular to a plane passing through an axis of the seat and through an axis of the cylinder and through a lower cylinder covering half of a valve head opposite the generating line, wherein the nozzles are also oriented to create a tangential speed in a same direction (See Figure 1), and

wherein angles of the seats (1) are chosen to optimize stratification of a combustive charge (See Paragraph [0019]).

However Gianolio fails to disclose the valves being bearing valves.

Nelson teaches that it is conventional in the art of valve control for internal combustion engines, to utilize flat cylinder head bearing valves (B and 10).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the flat cylinder head bearing valves, as taught by Nelson, to improve the performance efficiency of the Gianolio valves.

Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gianolio et al. (Pub. Number US 2003/0005898 A1), in view of either Nelson (Patent Number 1,370,346), and further in view of Hammer (patent Number 6,766,778 B2).

Gianolio discloses a reciprocating engine including a flat cylinder head valves having faces on a chamber side which are coplanar with the cylinder head and substantially tangent to a cylinder,

wherein a conical surface of intake valves is extended towards a piston by a cylindrical part having a height slightly greater than a lift of the valves,

wherein the conical surfaces of the valves are disposed at a bottom of cylindrical recesses (Not Numbered) provided in a cylinder head in order to receive cylindrical parts of the valves such that flat lower faces of the valves are in a plane of the cylinder head when the lower faces rest on the associated seats thereof, a clearance between the recesses and the valves being minimal (See Figure 1), and

wherein the recesses are provided in the cylinder head and do not go beyond the following boundaries (See Figure 1):

- two cylindrical portions concentric with a bore and tangent externally and internally to the cylindrical recess (Not Numbered) of each valve, and

- a conical surface extending a half-seat of the valve delimited by a plane passing through an axis thereof and an axis of the cylinder;

wherein the recesses (Not Numbered) are also oriented to create a tangential velocity in a same direction, and

wherein an angle of the seats is chosen to optimize a stratification of a combustive charge (See Figures 1 and 8 A-G, and Paragraph 9).

However Gianolio fails to disclose the bearing valves, and a conical-sealing bearing surface.

Nelson teaches that it is conventional in the art of valve control for internal combustion engines, to utilize flat cylinder head bearing valves (B and 10).

Additionally, Hammer teaches that it is conventional in the art of valve control for internal combustion engines, to utilize a conical sealing bearing surface (See Column 2, lines 58-65 and claim 4).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the flat cylinder head bearing valves, as taught by Nelson, and a conical sealing bearing surface, as taught by Hammer, to improve the performance efficiency of the Gianolio valves.

Allowable Subject Matter

Claims 44-45, 47, 49-50 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- zur Loye et al. (US Patent Number 6,561,157 B2) disclose a multiple operating mode engine and method of operation.

- Flynn et al. (US Patent Number 6,286,482 B1) disclose a premixed charge compression ignition engine with optimal combustion control.

- Iiyama et al. (US Patent Number 6,234,123 B1) disclose a four-cycle internal combustion engine and valve timing control method thereof.

- Romanelli (US Patent Number 5,042,443) discloses a multiple valve internal combustion engine.

- Myers et al. (US Patent Number 3,494,336) discloses a method and apparatus for reducing exhaust emissions and improving fuel utilization in internal combustion engines.

- Bishop et al. (US Patent Number 3,315,650) disclose an internal combustion engine.

- Engemann (US Patent Number 3,009,450) disclose an automatic clearance regulation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thai-Ba Trieu whose telephone number is (571) 272-4867. The examiner can normally be reached on Monday - Thursday (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TTB
February 24, 2006

Thai-Ba Trieu
Primary Examiner
Art Unit 3748